

TECHNOLOGY UTILIZATION

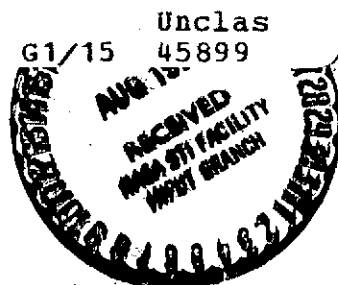
HAND TOOLS

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A COMPILATION



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Foreword

The National Aeronautics and Space Administration and the Atomic Energy Commission have established a Technology Utilization Program for the dissemination of information on technological developments which have potential utility outside the aerospace community. By encouraging multiple application of the results of its research and development, NASA and AEC earn for the public an increased return on the investment in aerospace research and development programs.

This publication is part of a series intended to provide such technical information. The items reported range widely in the field of mechanical assembly, material finishing, and inspection. They may be of interest to manufacturers and/or repair and service industries.

Additional technical information on individual devices and techniques can be requested by circling the appropriate number on the Reader Service Card included in this Compilation.

Patent Statements reflect the latest information available at the final preparation of this Compilation. For those innovations on which NASA and AEC have decided not to apply for a patent, a Patent Statement is not included. Potential users of items described herein should consult the cognizant organization for updated patent information at that time.

Patent information is included with several articles. For the reader's convenience, this information is repeated, along with more recently received information on other items, on the page following the last article in the text.

We appreciate comment by readers and welcome hearing about the relevance and utility of the information on this Compilation.

Jeffrey T. Hamilton, *Director*
Technology Utilization Office
National Aeronautics and Space Administration

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Section 1.

Tools for Assembly and Disassembly Applications

MULTISIZE WRENCHING SYSTEM

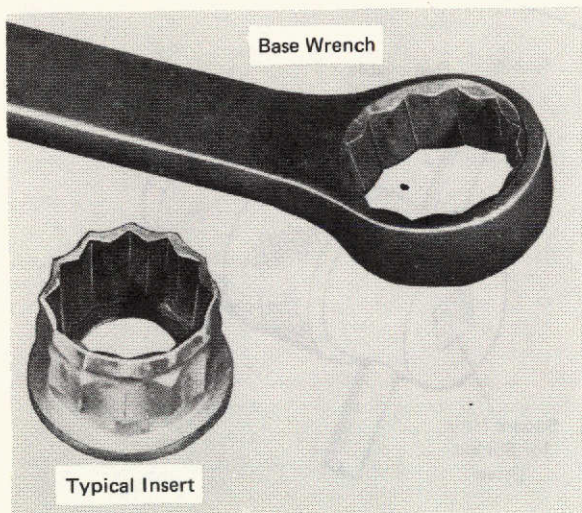


Figure 1

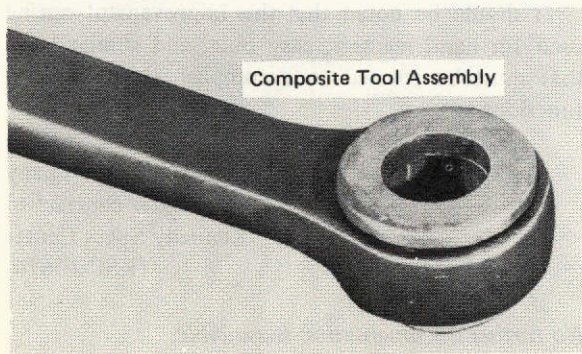


Figure 2

The rotation of threaded fittings, such as nuts and bolts, in assembly and disassembly operations is often performed with box-end wrenches. When the need for such wrenches is remote from the tool supply and the exact size required is not known, a large number of wrenches may have to be carried to the worksite. A modified version of the box-end wrench has been developed which provides greater flexibility and convenience. One wrench and a set of varying-sized inserts are all that need to be carried to the working area.

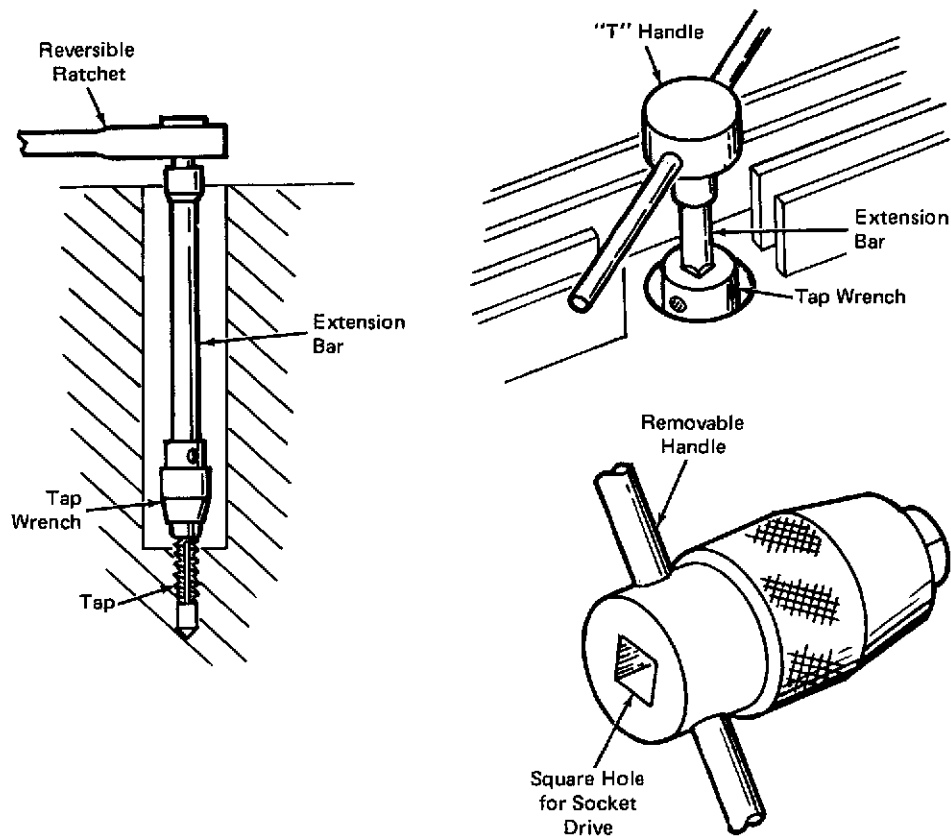
Figure 1 shows the separate parts, and Figure 2 shows a composite working-tool assembly. The exterior portions of the steel insert is fabricated to fit freely into the wrench opening and has an external flange diameter large enough to stop on the exterior surface of the wrench. The interior of the insert has the wrenching configuration of a corresponding box-end wrench. The wrench and insert shown in the illustrations have twelve-point engagements. Four-, six-, and eight-point arrangements can also be used.

Retention of the insert to the base wrench is made by a snap ring engaging a circular groove of the insert. Removal of the insert from the base wrench is made by pushing on the unflanged end of the insert.

Source: L. W. Rabb and R. T. Ferry of
The Boeing Company
under contract to
Kennedy Space Center
(KSC-10569)

No further documentation is available.

INCREASED CAPACITY FOR TAP WRENCHES



Tapping holes may be located in areas that prevent the rotation of conventional tapping wrenches. Tap wrenches have handles that are used to apply the rotational force necessary to tap the hole. If the handle cannot be rotated, because of restrictions, tapping cannot be accomplished. To overcome this difficulty, several techniques have been developed.

The figure illustrates a modification of the tap wrench which increases the capacity of the tool. A square hole is machined into the head of the tap wrench so that it can be driven by standard socket wrenches and appropriate extension bars. The size of the hole must correspond to a socket drive that has

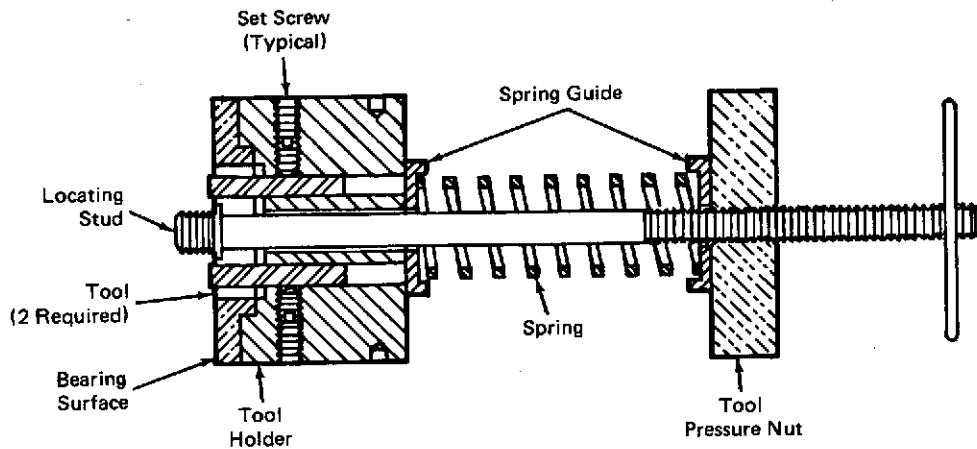
the needed torque capability, i.e., 0.635-cm (1/4-in.), 0.95-cm (3/8-in.), 1.27-cm (1/2-in.), etc.

It should be noted that this improvement can be used for hand reamers, easy outs, and similar tools that must be rotated to accomplish their intended functions.

Source: E. T. Neal of
The Boeing Company
under contract to
Kennedy Space Center
(KSC-10674)

No further documentation is available.

HONEYCOMB INSERT FACING TOOL



In the manufacture of honeycomb structures, inserts are installed for fastening and supporting hardware. The insert installation process entails drilling an oversized hole, installing the insert, and securing it with epoxy resin. For various reasons, the inserts are often tilted and not flush with the faceplate of the honeycomb structure. Mounting equipment to inserts that are tilted presents two problems: (1) the mounted components are stressed, due to the non-planer mounting surface, which could result in damage to the components, and (2) the components mounted to the inserts do not contact the faceplate of the honeycomb structure, preventing good electrical contact.

Previously, electrical contact was made either by providing ground straps or by using a pneumatic tool with a cutter. The second method made the inserts flush, but it was unsatisfactory because there was no provision for locating or holding the tool parallel to the honeycomb faceplate, and there was no means for applying a constant load on the tool, resulting in tool chatter. In general, flushing inserts with a

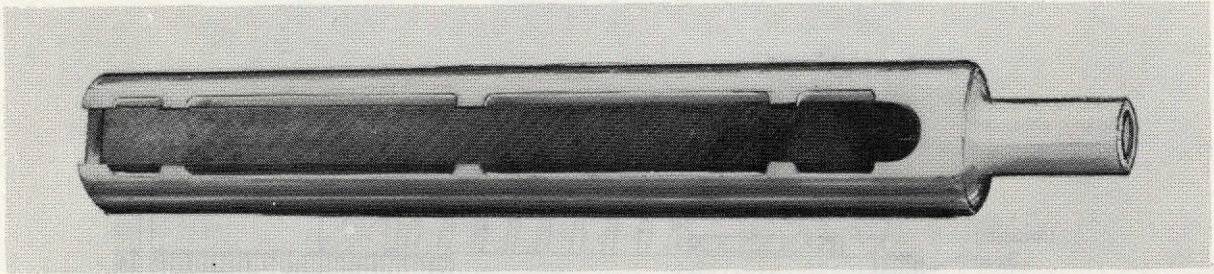
pneumatic tool was "trial and error," the resulting surface was rough, and it varied considerably from insert to insert.

A better method, utilizing a newly devised hand tool (see figure), provides a smooth mounting surface that is parallel to the honeycomb faceplate and provides consistency from insert to insert. The tool is secured to the insert, thus accurately locating the cutting tool in reference to the insert. The bearing surface on the tool contacts the honeycomb faceplate, which defines the plane of the finished insert. A constant force is applied on the tool by a spring, thus alleviating chatter. The cutters of the hand tool are adjusted so that the insert is flush to the faceplate of the honeycomb, or they may be adjusted for undercutting.

Source: W. J. Abernathy and L. G. Snoddy
Marshall Space Flight Center
(MFS-21485)

Circle 1 on Reader Service Card.

FILE HOLDER FOR VACUUM DEBRIS REMOVAL



A special nylon enclosure (see figure) provides a proportioned flow of air around a conventional file to effectively remove cuttings into a clean-room vacuum, debris removal system. This device was developed and used for special repair work in an assembly clean-room area. Plastic was used in order to protect other critical parts from damage by the file during its use.

Source: J. A. Stein of
Rockwell International Corp.
under contract to
Johnson Space Center
(MSC-15718)

No further documentation is available.

EXTERNAL O-RING INSTALLATION TOOL

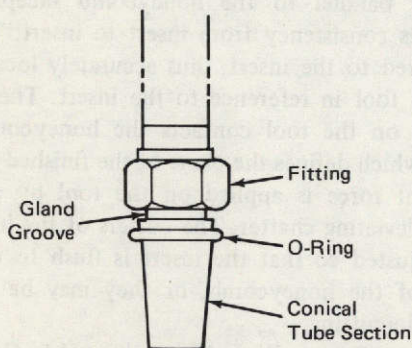


Figure 1. The conical tube section is placed over the thread, and the O-ring is slid into position.

An O-ring installation tool has been designed that facilitates the installation of O-rings over sharp external threads. Previously, when an O-ring was pushed over sharp threads into the gland groove, it was often damaged, providing an ineffective seal. The installation tool permits the O-ring to be installed without contacting the sharp threads.

The device consists of a hollow conical tube section, sized to slip over the threaded portion of the fitting as shown in Figures 1 and 2. The O-ring is rolled or slid along the tapered surface until it slips off the tool and into the gland.

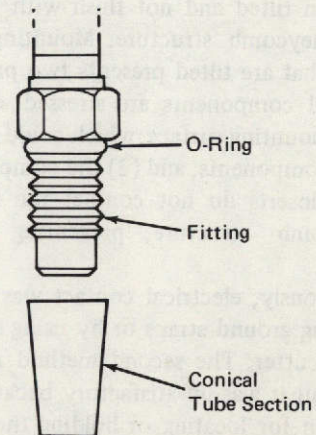


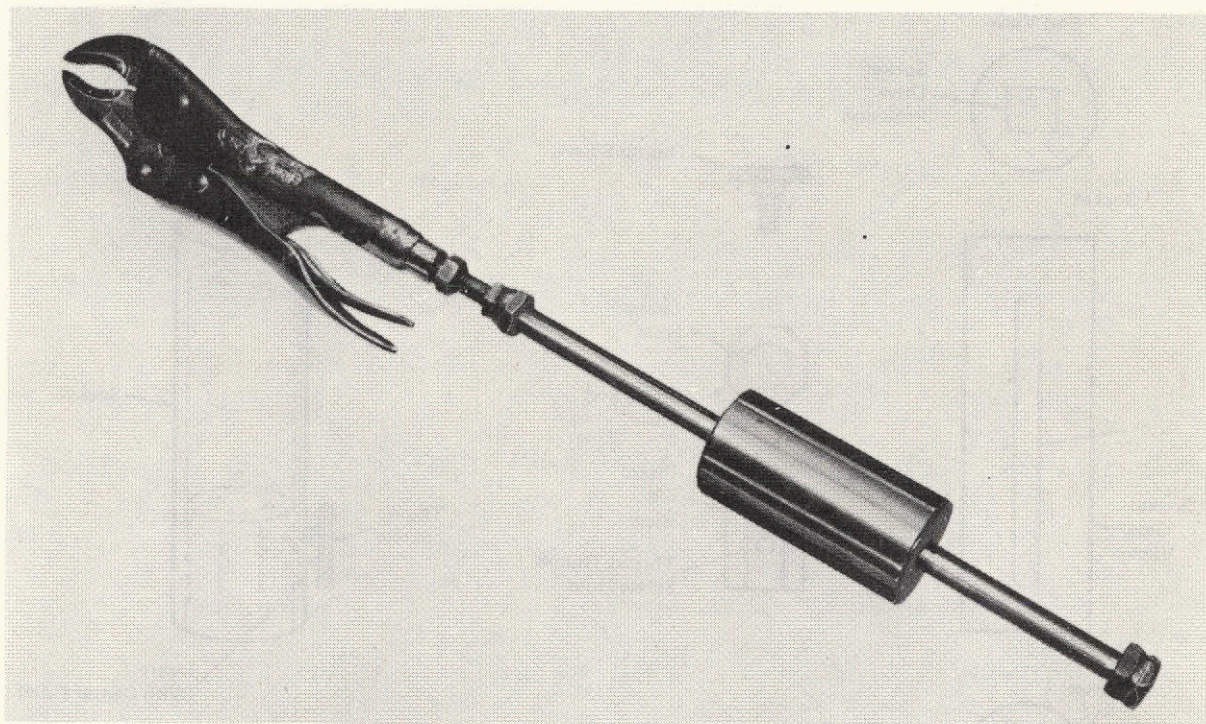
Figure 2. The O-ring in place, the conical section is removed, and the ring is installed without damage.

The conical tube section can be fabricated in any size to match the fitting.

Source: C. M. Ray of
General Dynamics Astronautics
under contract to
Lewis Research Center
(LEW-00378)

No further documentation is available.

PIN-NAIL PULLER



The production tool shown in the figure was developed for extracting cable-harness routing pin-nails from jig boards without bending them, even in confined areas. Prior to the development of this tool, wire harness pins could not be removed from the jig board in confined areas without damaging the pins. The pin-nail puller reduces manufacturing costs by making it unnecessary to replace damaged pins.

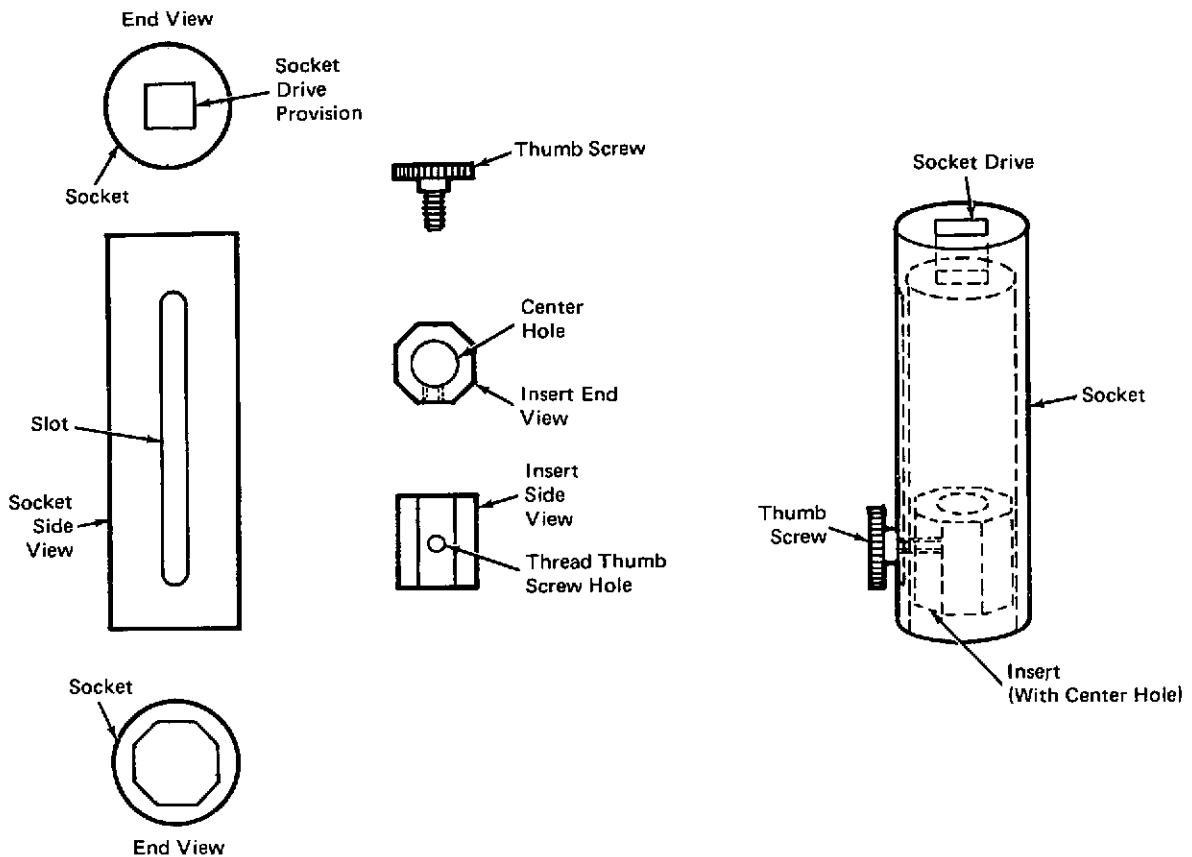
The pin-nail puller consists of a combination of two standard tools: a standard, auto gear "knockout" bar and a standard pair of locking pliers. The locking

pliers are adjusted to hold the pin securely. They are then clamped to the pin, with the handle and knockout bar lined up with the pin. The knockout bar is then operated, and the pin is pulled out of the jig board without bending. Neither the pin nor the board is damaged by this procedure.

Source: A. Chavez of
Rockwell International Corp.
under contract to
Johnson Space Center
(MSC-11850)

No further documentation is available.

ADJUSTABLE-DEPTH SOCKET



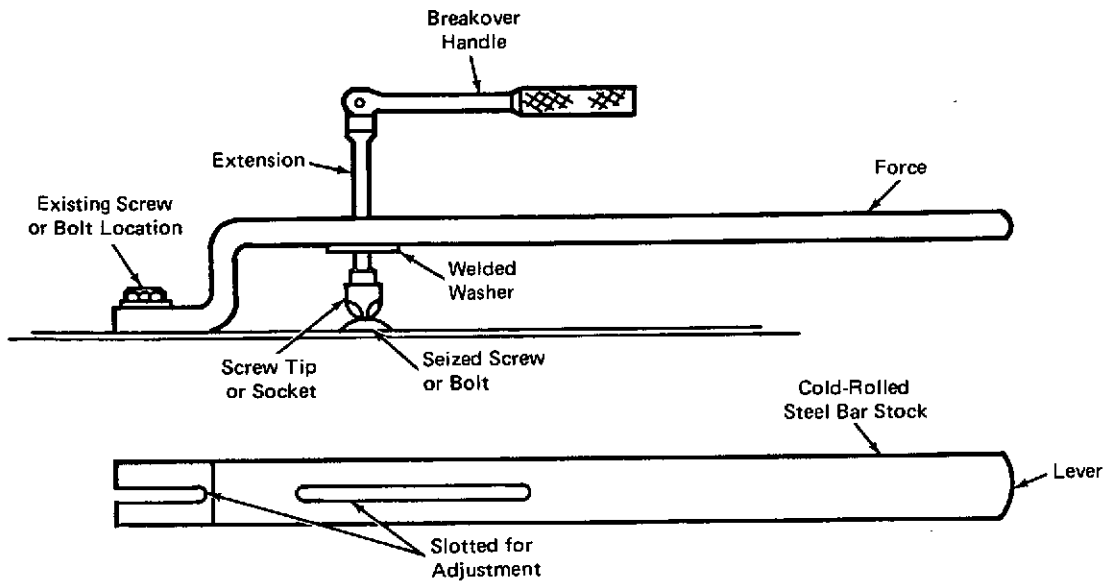
A depth-adjustable insert (see figure) can be installed in a torque-wrench socket to alter the gripping area. With this arrangement, the socket can be adjusted to a selected depth for installing locking nuts, or for obtaining accurate torque-value readings (no socket drag), for holding the nut forward in the socket (for starting in inaccessible locations), or for eliminating damage to the chassis finish due to socket rub.

This tool may be manufactured from a standard "deep reach" socket, provided that the tooled surface runs the entire length of the socket.

Source: J. Ash of
Rockwell International Corp.
under contract to
Marshall Space Flight Center
(MFS-16799)

Circle 2 on Reader Service Card.

REMOVAL TOOL FOR SEIZED SCREWS OR BOLTS



Seized Bolt- or Screw-Removal Tool

The tool assembly shown in the figure was designed for removing seized screws or bolts. The tool provides the pressure necessary to hold a screwdriver blade in the head of the screw that is to be removed. Previously, seized screws usually had to be drilled out.

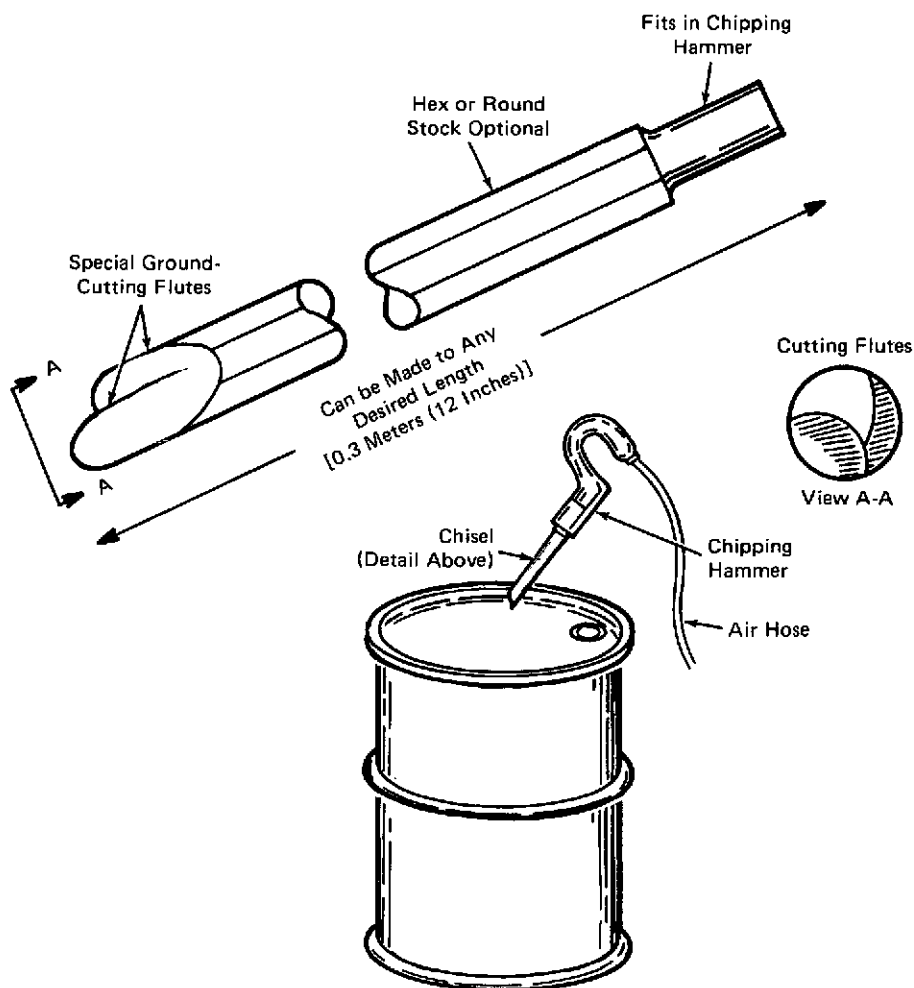
The feature of this tool is the use of a lever and a screwdriver with lever platform to provide a pressure plate. The main body of the tool is fabricated from cold-rolled steel bar stock. All other items are standard tools.

In order to remove a seized screw, remove another screw in the local area and attach the tool by using a bolt and washer of appropriate length. Insert the screwdriver blade in the screw, apply force, and back the screw out with breakover handle.

Source: F. Underhill of
Rockwell International Corp.
under contract to
Johnson Space Center
(MSC-11860)

No further documentation is available.

TOOL FOR REMOVING TOPS OF METAL BARRELS

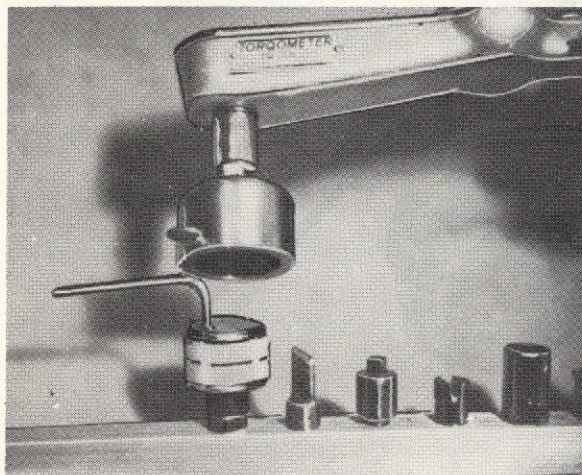


A faster, safer, and more economical method of removing the tops from metal barrels involves the use of a special cutting tool with a chipping-type air hammer (see figure). The cutting tool is a chisel with one end fabricated so that it will fit into an air hammer. The opposite end is shaped with edges that permit cutting without continuous slipping of the tool off of the barrel top surface. The device is intended for use in opening large numbers of barrels.

Source: O. G. Dillner of
Rockwell International Corp.
under contract to
Marshall Space Flight Center
(MFS-19150)

Circle 3 on Reader Service Card.

ADAPTER SET FOR PRECISION-CONTROLLED CLAMPING DEVICES



A set of clamping devices (adapters), which can be used to control the torque on standard screws and bolts, by allowing them to accommodate standard torque wrenches, has been developed and used in production operations. The use of these adapters (see figure) permits common machine screws to function as precision holddowns at a fraction of the cost of alternate methods. Any small industry or shop can have the same precision clamping and holddown

ability as the largest corporation, by using a single torque handle and economical machine bolts. The large industries, with high-volume requirements for tooling accessories, can effect major savings by the application of "value engineering" techniques to their tooling designs.

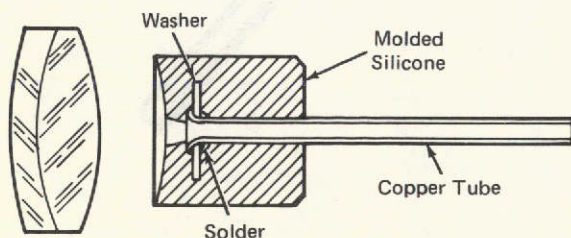
The adapter sets are simple low-cost mechanical devices that can be used at any skill level. Their use will prevent unnecessary damage to honeycomb panels and other pressure-sensitive components when using clamping devices. Prior methods depended on experience, personal opinion, and the variations of "feel", all of which can differ widely among personnel. Honeycomb sandwich panels, in particular, are light and strong, yet they are easily damaged by excessive pressure in local areas. Only a one-half "extra" turn of the tightening clamp can crush the material.

Source: R. L. Peters of
Rockwell International Corp.
under contract to
Johnson Space Center
(MSC-15197)

Circle 4 on Reader Service Card.

VACUUM LENS-HOLDER TOOL

A vacuum holding tool (see figure) is used to assemble (or disassemble) a lens or lens system within an extended cylinder. Previously, a design layout of the individual lens had to be made to calculate the diameter of a standard O-ring to be used and to establish a clearance angle, so that the metallic part of a positioning tool never made contact with the critical surface of the lens. This was a time-consuming procedure.



The vacuum lens-holder tool consists of a copper tube, flared at one end, with a washer soldered to the flared end. The tube-and-washer assembly is positioned away from a spherical blank of slightly smaller radius than the prime lens by a removable plug placed in the tube opening. The tube, washer, and spherical blank are then held centrally within a tubular sleeve (smaller in diameter than the prime tube that the tool must enter), which is then filled with silicone rubber. When the molded silicone rubber is set, the tool can be used as a lens holder.

Source: A. A. Bisculca of
Kollsman Instrument Corp.
under contract to
Johnson Space Center
(MSC-12076)

No further documentation is available.

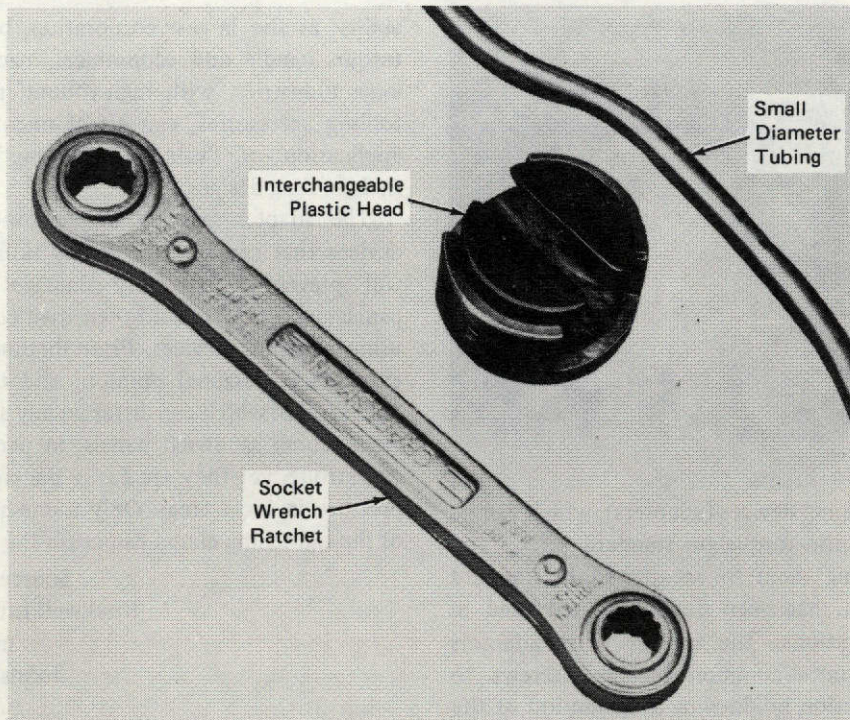
TUBE BENDER-ADAPTER FOR SOCKET WRENCH RATCHET HANDLE

Figure 1. Bender-Adapter and Socket Wrench

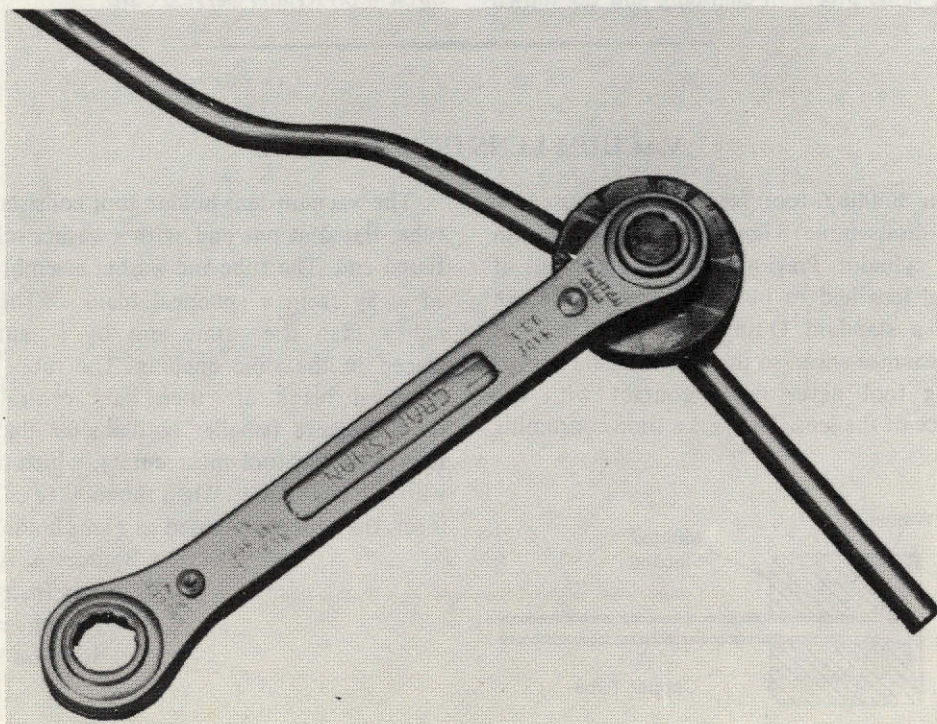


Figure 2. Application of Tool Assembly

The tool shown in the illustrations is a tube-bending accessory for a socket wrench ratchet handle. The tool is capable of making bends up to 10 degrees on relatively light tubing. Interchangeable plastic heads for 3/16-in. (0.48-cm) through 3/8-in. (0.95-cm) outer diameter tubing are provided. The tool combination can be used for low-angle, in-place bend corrections during the final assembly fitment of fluid system lines.

Presently available commercial benders for small tubing are designed for bench bending up to 180-

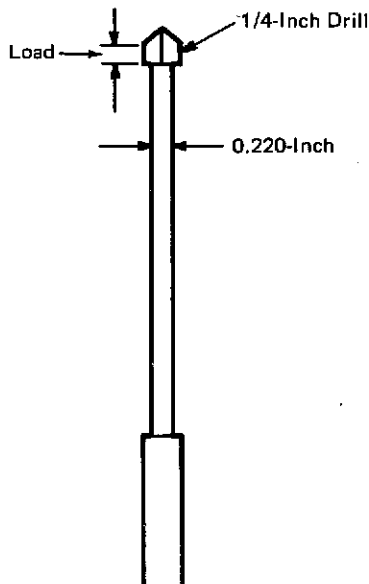
degree turns. They are much larger and heavier than the new tool. The new ratchet-positioned bender can reach into previously inaccessible areas and make many in-place corrections.

Source: D. R. Lange of
Rockwell International Corp.
under contract to
Johnson Space Center
(MSC-15414)

No further documentation is available.

TOOL FOR DRILLING PLASTICS

A drill especially suited for drilling holes through plastics has now been developed. Conventional twist drills, as used for drilling metal and wood, are not satisfactory for drilling plastics if close tolerances and a smooth-walled bore are required. When conventional drills are used in plastic, the chips (the material removed by the drill) accumulate between



the body of the drill and the side of the hole, binding the drill and causing additional material to be removed from the wall. The result is a hole with a larger diameter at one end than at the other end and a rough surface. Also, tool life is fairly short. In some instances, such as drilling plastics to be used for optical purposes, such conditions are very undesirable and detrimental.

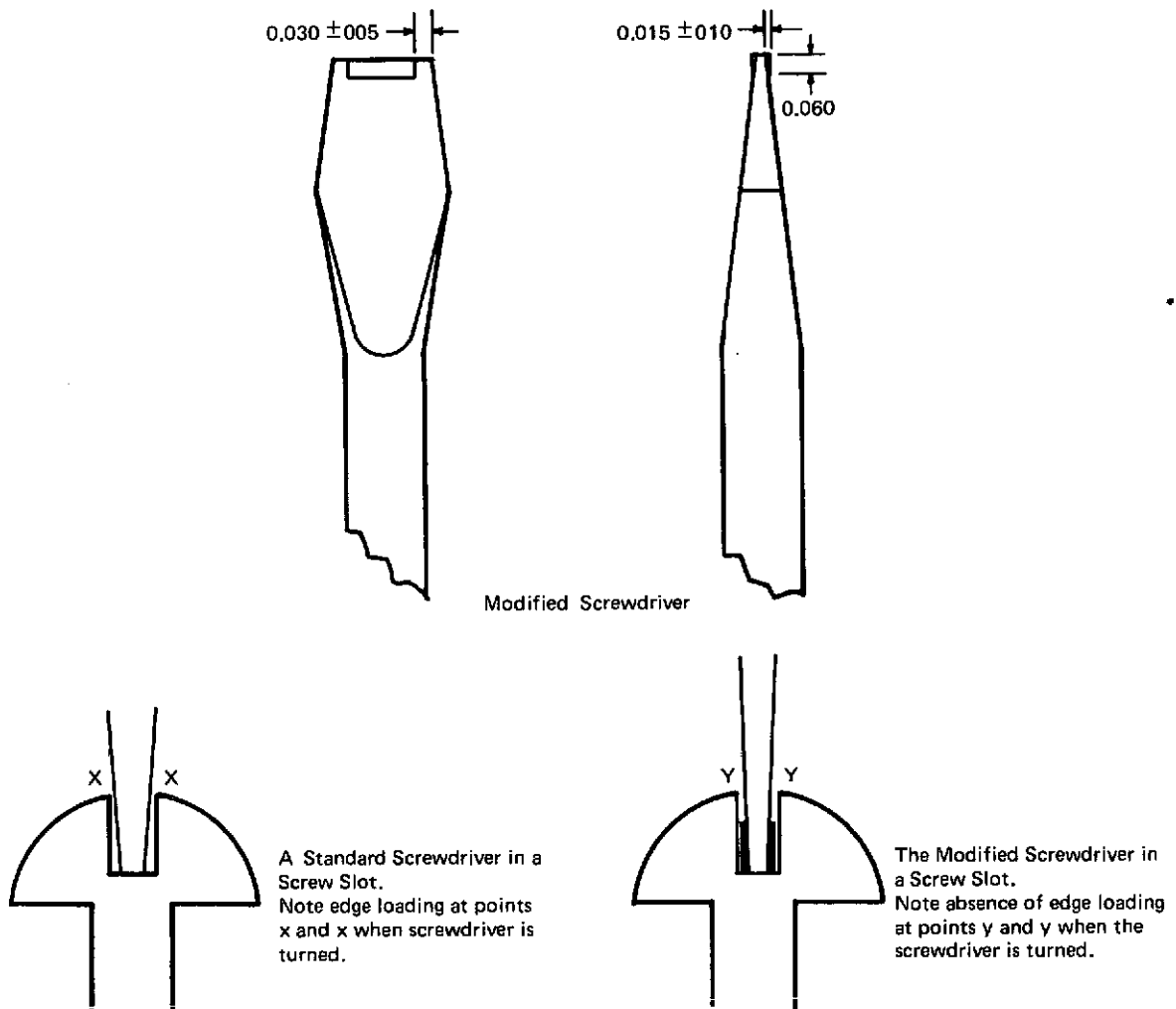
The point of the new drill is essentially identical to that of the conventional straight flute drills, but the shank of the drill has a reduced diameter (see figure), so that chips are not pressed against the side of the hole.

The drill should be useful in machine shops because of the higher degree of accuracy obtainable and the increased tool life.

Source: C. Krasel of
University of California
under contract to
Lawrence Berkley Laboratory
(LRL-10030)

No further documentation is available.

IMPROVED SCREWDRIVERS



The driver blade of a screwdriver can be modified to distribute the torque load away from the edges of the driving slot (see figure). This modification will prevent objectionable raised material (burrs) on slotted fasteners (screws). The technique can be used for all slotted, recessed screw installations where raised material is cause for rejection or is otherwise objectionable.

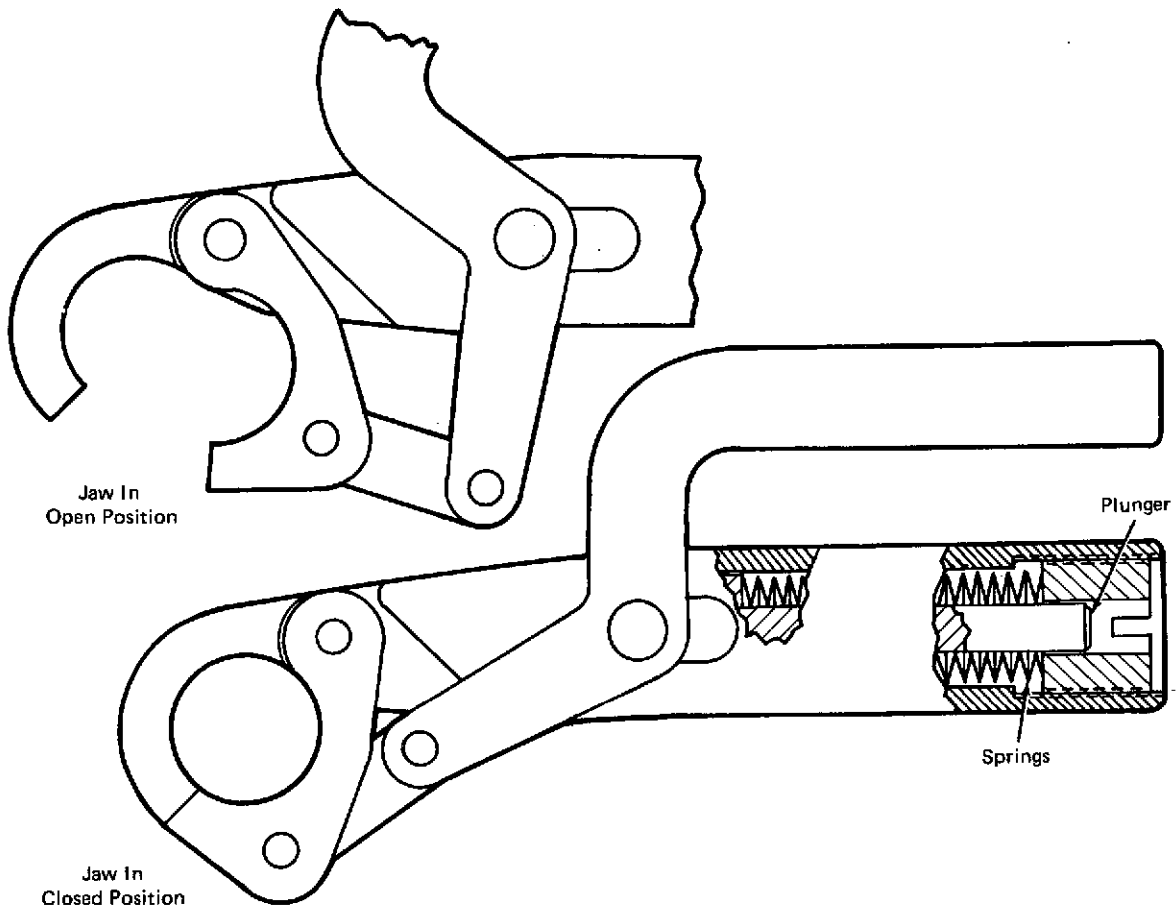
Conventional screwdrivers are tapered too thinly at the end of the blade. The direction of the taper is the reverse of what it should be to prevent raised metal burrs. The direction of the taper actually contributes to the screwdriver blade being forced out

of the driving slot. In addition, the driving torque creates a moment which tends to force the screwdriver out of the driving slot. The result is slippage across the edges of the slot causing objectionable burrs.

Source: M. M. Holben and L. E. Bullock of
Rockwell International Corp.
under contract to
Johnson Space Center
(MSC-15642)

No further documentation is available.

LOCK-GRIP PLIERS



The lock-grip pliers (see figure), which are somewhat similar to commercial locking pliers, adjust automatically and can be operated with only one hand. A series of Belleville springs provides predetermined jaw pressure to grip plates up to 0.6-cm (0.25-in.) thick or tubes up to 1.27-cm (0.5-in.) in diameter.

Previously available devices lock positively by means of a screw adjustment or by wedge action. Both types are undesirable because the jaw pressure must be varied by the operator. The new lock-grip pliers provide self-locking action, which adjusts to various thicknesses without requiring a two-handed screw-type operation. By the use of Belleville springs

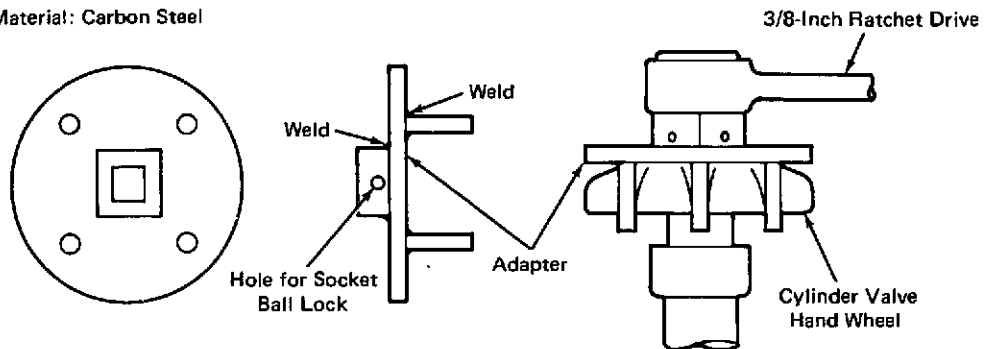
to form the pivot point, the tension rate of the springs controls the jaw pressure, and the deflection of the springs provides automatic compensation for various openings.

Source: N. Javas
Johnson Space Center
and C. Miller of
Service Technology Corp.
under contract to
Johnson Space Center
(MSC-13743)

No further documentation is available.

ADAPTER FOR COMPRESSED GAS CYLINDER VALVE

Adapter Material: Carbon Steel



The tool shown in the figure is a mechanical device which, when attached to a standard 3/8-in. (0.95-cm) ratchet drive, is used to provide quick and easy opening and closing of compressed gas cylinder valves.

Previously, a wrench has been applied to either the valve handwheel or valve stem to open a tightly closed, compressed gas cylinder valve, or to close one on a cylinder when slight leakage is observed. This method should be avoided because of the possibility of damage to the handwheel or stem.

Utilization of the adapter allows quick and easy opening or closing of the valves and precludes damage to the handwheel and/or stem.

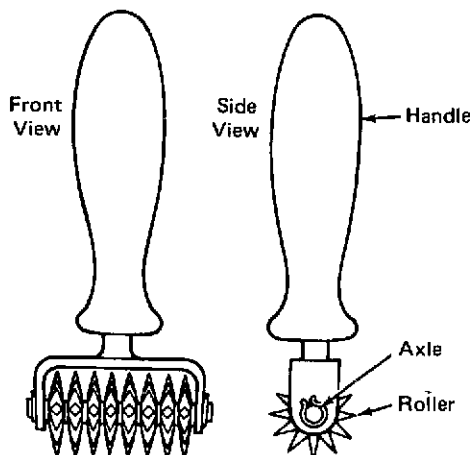
Source: R. J. Polzin of
Rockwell International Corp.
under contract to
Johnson Space Center
(MSC-13030)

No further documentation is available.

Section 2. Tools for Material Finishing

SURFACE PREPARATION TOOL

The tool shown in the figure was developed to mechanically puncture and open a soft surface, for the purpose of increasing and improving adhesion

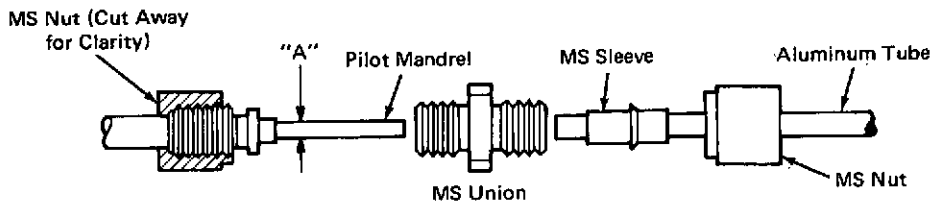


areas to which glues, resins, etc., are to be applied. The tool consists of a roller manipulated by a short handle. The roller comprises a series of sharply pointed star wheels, each independently rotatable about a common axis. Because the star-wheel axle is rigidly secured to the handle, force applied on the handle causes the wheel points to be collectively pressed into the surface to be treated. Such indentations provide a greater gripping surface for adhesives.

Source: L. G. Kaigler
Johnson Space Center
(MSC-12176)

No further documentation is available.

PRESETTING TOOL FOR SOFT ALUMINUM



NOTE:

Outside dimension of pilot mandrel is I.D. of aluminum tube. Other dimensions of mandrel are compatible with MS nut and MS union. View shows proper assembly to accomplish presetting operation.

The pilot mandrel is machined from steel of sufficient hardness.

A compact portable tool for presetting a mild steel (MS) sleeve on soft aluminum tubing has been developed (see figure). The tool consists of one MS nut, one MS union, and a steel pilot mandrel. The pilot mandrel prevents collapse of the wall of soft aluminum tubing during presetting of the sleeve. The parts of the tool, except the mandrel, are standard MS fittings that are readily obtainable.

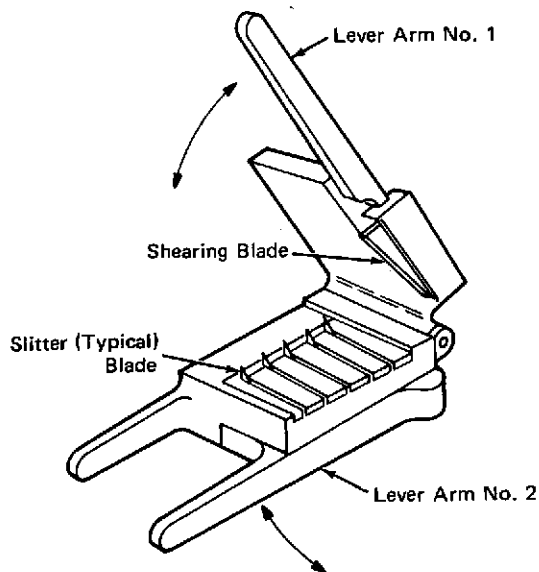
To operate: Use a lubricant compatible with the type of tubing system. Bottom the prepared tube end

in the union. Tighten the MS nut until the cutting edge of the sleeve grips the tube. Then tighten the nut 1 to 1-1/6 turns.

Source: C. W. Seiple of Rockwell International Corp. under contract to Johnson Space Center (MSC-11429)

No further documentation is available.

PORTABLE, FLAT-CONDUCTOR-CABLE SHEARER AND INSULATION SLITTER



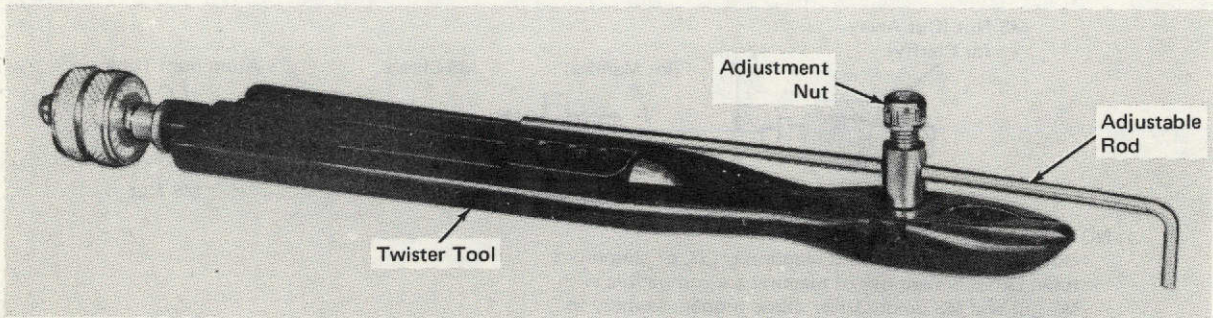
A portable tool designed to shear flat multi-conductor cables and to slit the insulation between the conductors has been developed (see figure). Essentially, the tool is a modification of a conventional papercutter.

In operation, the flat conductor cable is positioned, and Lever Arms No. 1 and No. 2 are squeezed together to accomplish a 90-degree cut of the flat cable. When Lever Arm No. 2 is pulled outward, the insulation at the end is slit separating the individual conductors. The slitting blades are not adjustable, therefore only one size cable is accommodated.

Source: E. J. Stringer and J. D. Doyle of Rockwell International Corp. under contract to Johnson Space Center (MFS-24186)

Circle 5 on Reader Service Card.

WIRE TWISTER WITH MODIFICATION



The addition of an adjustable rod (see figure) at the nose of a twister tool provides a stop for measuring the exact wire length between each fastener during safety wire installations. Using this tool, the safety wires twisted may be controlled with regard to rotational direction, tension, and number of turns produced.

The modification reduces the possibility of damaging the wire during installation. The tool is used as follows:

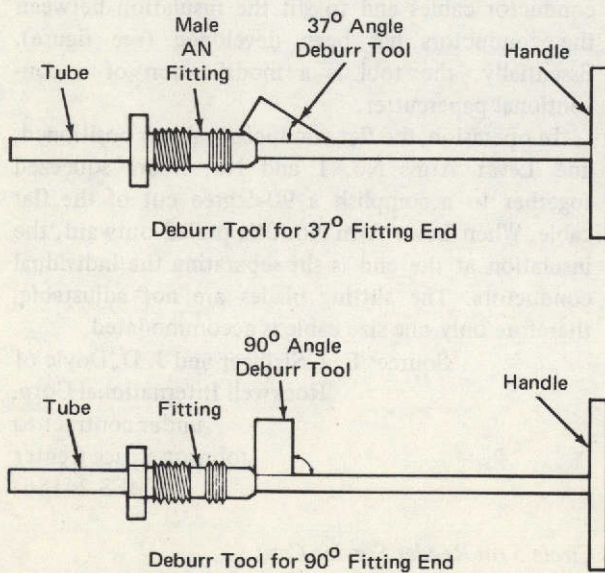
Grip the ends of the wire (a predetermined length is threaded through the first fastener) in the jaws of the wire twister, and slide the sleeve down with

the thumb to lock the handles. Locate the adjustable rod end to stop the wire twist adjacent to the entry point of the second fastener. Use the same procedure for subsequent attachment points in multiple-fastener safety wiring.

Source: H. A. Davis of
Rockwell International Corp.
under contract to
Johnson Space Center
(MSC-11169)

No further documentation is available.

DEBURR TOOL



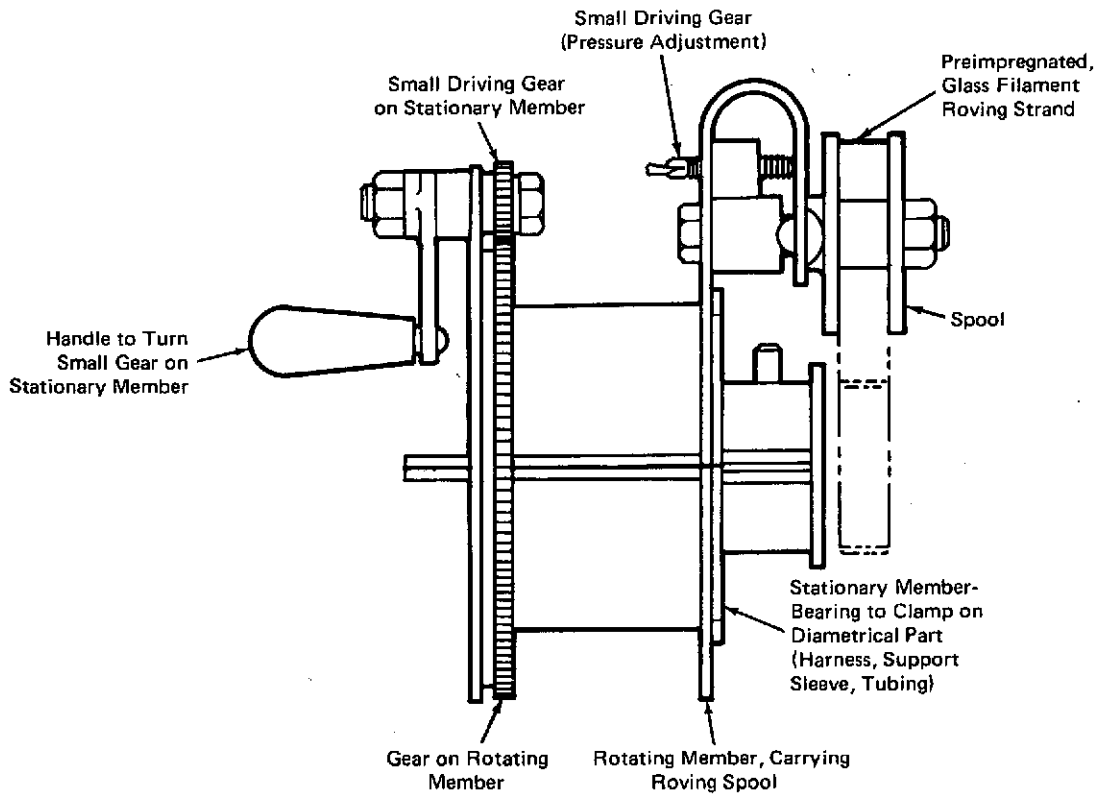
A deburr tool was created that will clean up the end of a male AN fitting after it has been damaged by overtightening of the B-nut (see figure). Previously, the burred fittings and tubes had to be replaced. Using this tool, it is possible to rework the defective fitting without removing and replacing the assembly.

The tool is a simple inserting device with a cutting edge to match the face of the AN fitting. By inserting the tool and turning the handle, the fitting can be easily deburred.

Source: C. W. Seiple and J. Martin of
Rockwell International Corp.
under contract to
Johnson Space Center
(MSC-11848)

No further documentation is available.

HAND-OPERATED ROVING TOOL



The mechanical assembly shown in the figure is a manual, filament-winding roving tool. The roving tool can be used for winding filament (e.g., wire, fiberglass, teflon) over an object which cannot be rotated. Such a tool may be useful in fabricating containers or for wrapping fragile parcels for shipping. The use of this tool will enable rapid uniform application of the filament.

The roving tool consists of two parts: (1) a stationary subassembly which clamps onto the work-piece and provides a bearing for the rotating member and (2) a rotating subassembly which carries a winding spool. A small gear is attached to the

stationary member, which engages with a larger gear mounted to the rotating part; and is turned by a handle, thereby turning the rotating member. The tension of the filament is controlled by adjustable friction buttons.

Source: I. Bobb of Rockwell International Corp. under contract to Marshall Space Flight Center (MFS-18884)

Circle 6 on Reader Service Card.

CIRCLE-CUTTING ADAPTER FOR SABRE SAW

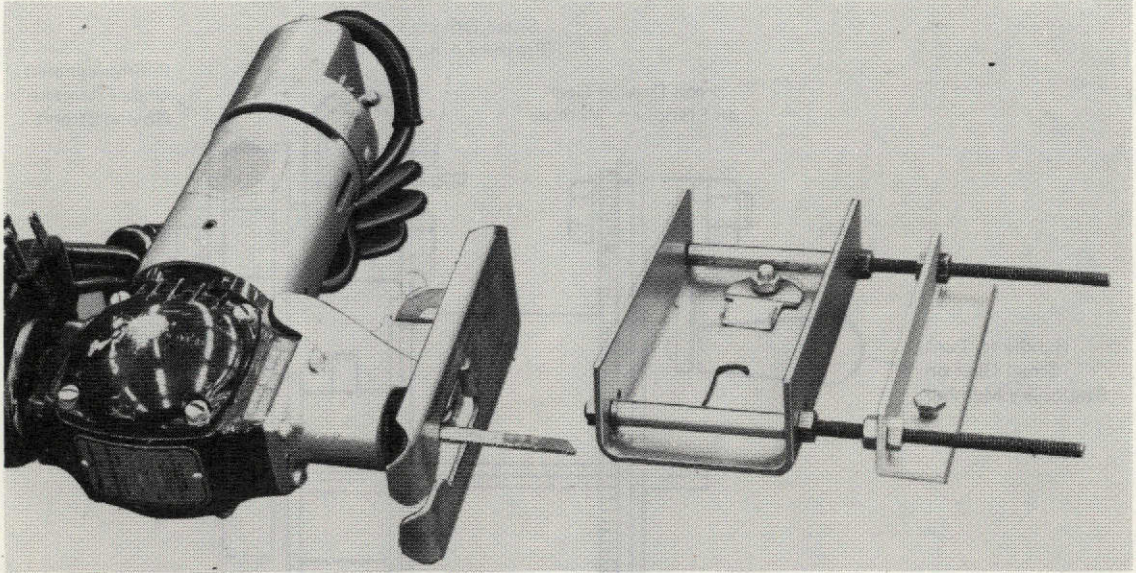


Figure 1. Sabre Saw and Adapter Fixture.

In small shops where circular cutters or other specialized machines are not available for cutting circular holes in metal plates of varying thicknesses, sabre saws are used. This is accomplished by drawing a circle of the required size and inserting the sabre saw in a pilot hole and following the contour of the circle. Upon completion, a half-round file is used to clean up the circle. Circle cutting guides may be purchased from manufacturers for some sabre saw

models; however, these are usually flimsy and more suitable for cutting holes in wood rather than in metal. The suggested circle cutting adapter (see figures) is rigid and may be fabricated easily to fit any sabre saw and used to cut precisely circular holes rapidly and accurately in relatively thick metal plates.

The circle cutting adapter shown in the photographs was fabricated from 1/8-in. (3.2-mm) thick aluminum sheet. The two sides of the base were bent

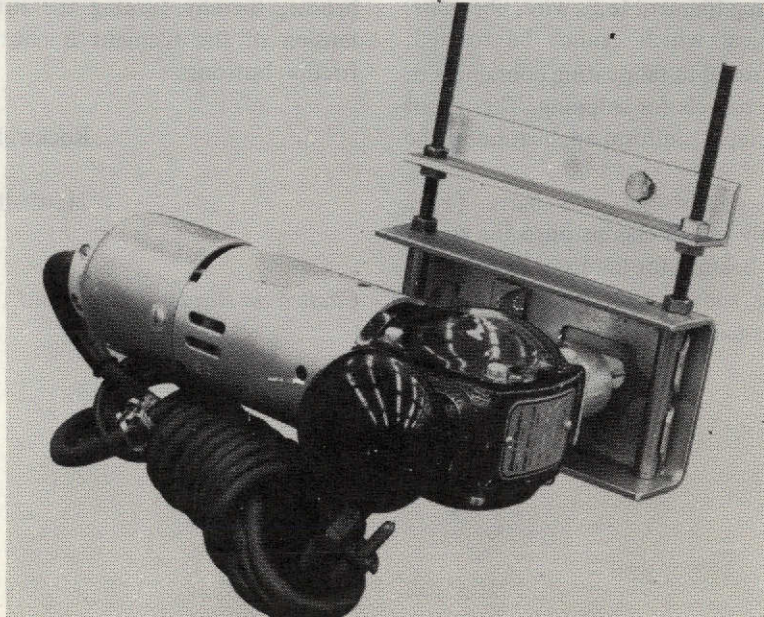


Figure 2. Sabre Saw Mounted to Adapter Fixture.

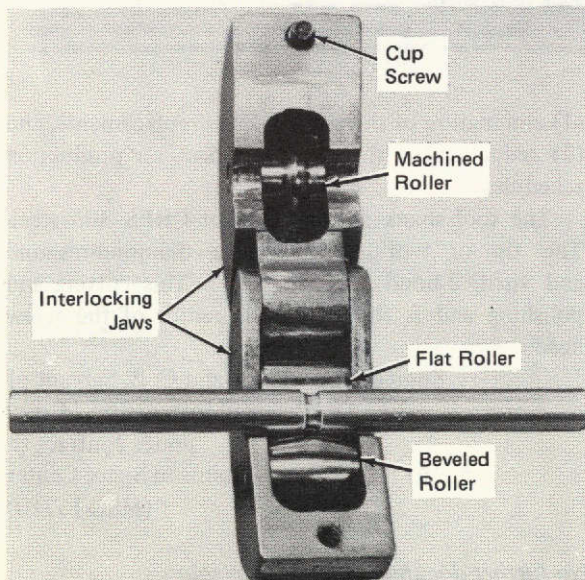
up to fit the sabre saw. A slot was cut in the base to accommodate the saw blade, and a clamping device was attached for locking the sabre saw in place. Two metal 1/4-in. (6.4-mm) diameter guide bars were threaded and secured to the base with spacers and nuts. A structural aluminum angle, 1 x 1 x 1/8-in. (25.4 x 25.4 x 3.2 mm) thick and 6-in. (152 mm) long was clearance drilled to fit the guide bars, and a 1/4-in. (6.4-mm) diameter guide hole was drilled in the structural angle. To cut a circular hole, a 1/4-in. (6.4-mm) diameter pilot center hole and a starting hole are drilled in the plate to be sawed. The angle is attached to the plate with a nut and bolt and secured over the guide bars with lock

nuts to form the desired radius. The sabre saw is secured in the base, and the circular hole is cut. Detailed dimensions are not shown since the adapter can be fabricated to fit a specifically shaped sabre saw. For cutting holes with larger radii, longer guide bars may be used.

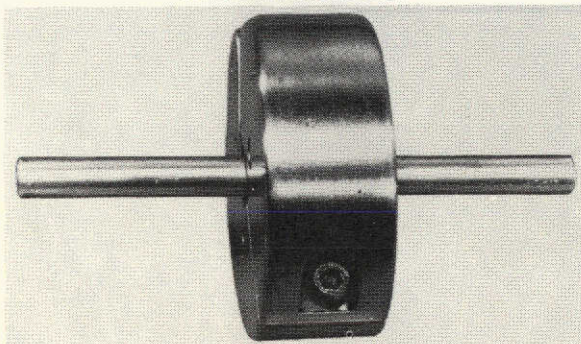
Source: D. C. Hopkins and R. M. Nakanishi of
Rockwell International Corp.
under contract to
Johnson Space Center
(MSC-15596)

No further documentation is available.

CRIMPING TOOL



Crimping Tool and Tube



Crimping Tool in Place as Restrictor

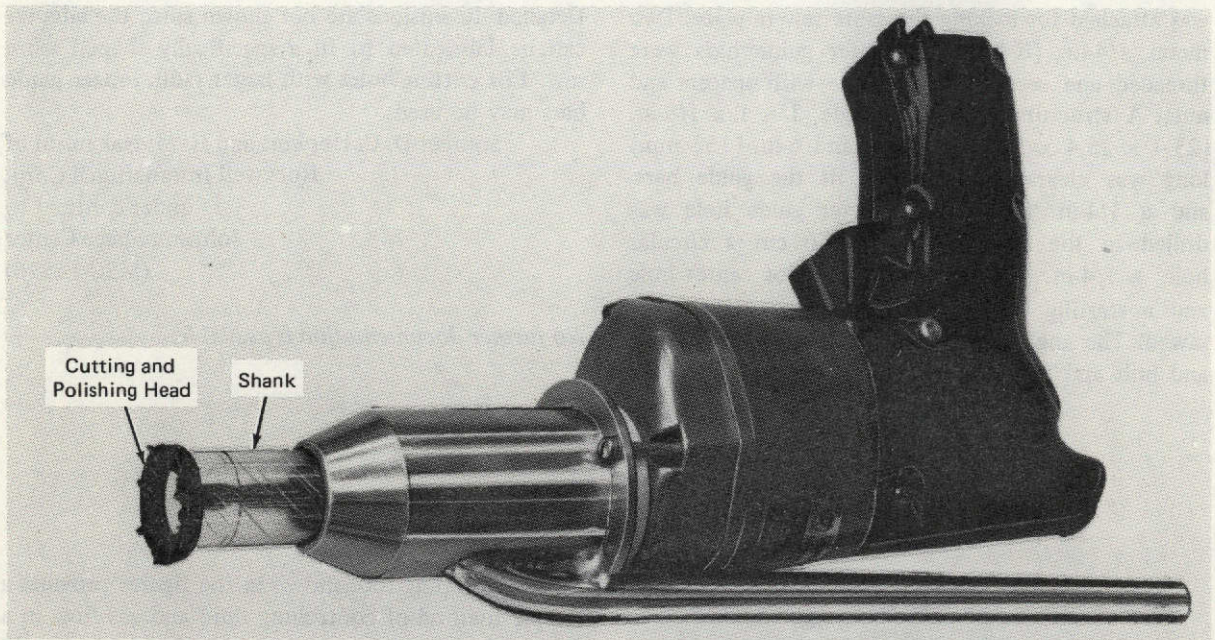
The crimping tool shown in the figures provides a simple method of controlling fluid and gas flow in a duct. After positioning, the tool is rotated manually to gradually reduce the diameter of the duct to a pre-selected dimension. A resulting restriction is accurate to within ± 0.13 mm (± 0.005 in.) of the pre-selected diameter. The compact size of this tool makes it ideal for use in confined areas.

The tool consists of two interlocking jaws pivoting about a pin near the outer surface. Diametrically opposite, they are interlocked by a capscrew which provides a means of compressing the jaws. The upper jaw houses a machined roller which forms the actual crimp. It is free-rolling, suspended longitudinally within the upper jaw on a pin. Two rollers are housed within the lower jaw: one a flat roller and the other a beveled roller. These assist the forming roller in gradually deforming the material. They, too, are free-rolling and suspended in the identical manner as the forming roller.

Source: D. J. Peck, F. A. Miller, and
P. N. Packer of
Rockwell International Corp.
under contract to
Johnson Space Center
(MSC-11513)

No further documentation is available.

TOOL FOR DEBURRING SCREW HEADS



The tool shown in the figure is designed for use with a power drill motor for deburring and polishing burred screw heads. The replacement of panel access screws that have been burred by repeated use, during final assembly and test operations, can be eliminated.

The previous method was to remove and replace a burred mounting screw on panels or other assemblies. Hundreds of screws are required to complete installations of panel assemblies. This tool will remove burrs that are on the heads of the screws, eliminating the need to remove and replace the screws having cosmetic defects. This process reduces the time lost in removing and replacing the superficially damaged screws and it has the following additional advantages:

- (1) elimination of the cost of screw replacements, and
- (2) reduction of the overall impact on production schedules.

The tool shank is fabricated of CRES 303 steel. The tip or working end is a diamond-resinoid and vitrified-bond abrasive wheel. This cutting and polishing end is shaped to the radius of the screw head.

Source: T. A. Tome and C. E. Sargent of
Rockwell International Corp.
under contract to
Johnson Space Center
(MSC-15710)

No further documentation is available.

SANDING ARBORS FOR SPOT-SURFACE FINISHING

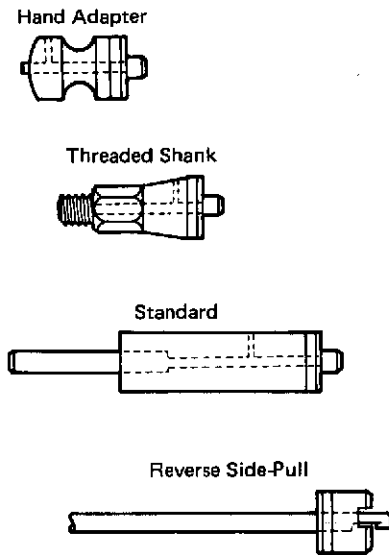


Figure 1. Adapters

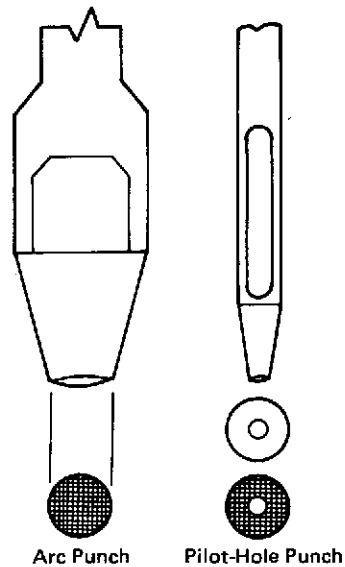


Figure 2

Simple shop techniques have been developed to make low-cost sets of miniature sanding disc tools, for use in removing anodizing (or polishing) on areas around existing holes. The tools (see figures) consist of special adapters, backing elements, and double-faced adhesive tape that are used with standard counterbore pilots. They are primarily intended for use with a drill motor, but a hand adapter is included.

Piloted, miniature abrasive disc tools can be used in most any industry, for cleaning, polishing, and deburring in counterbores or other special areas. In many cases, it is desired to remove paint or anodizing or to improve surface finish in the area around an existing hole in a part. Such an operation has been required to remove anodizing to insure a good electrical grounding connection.

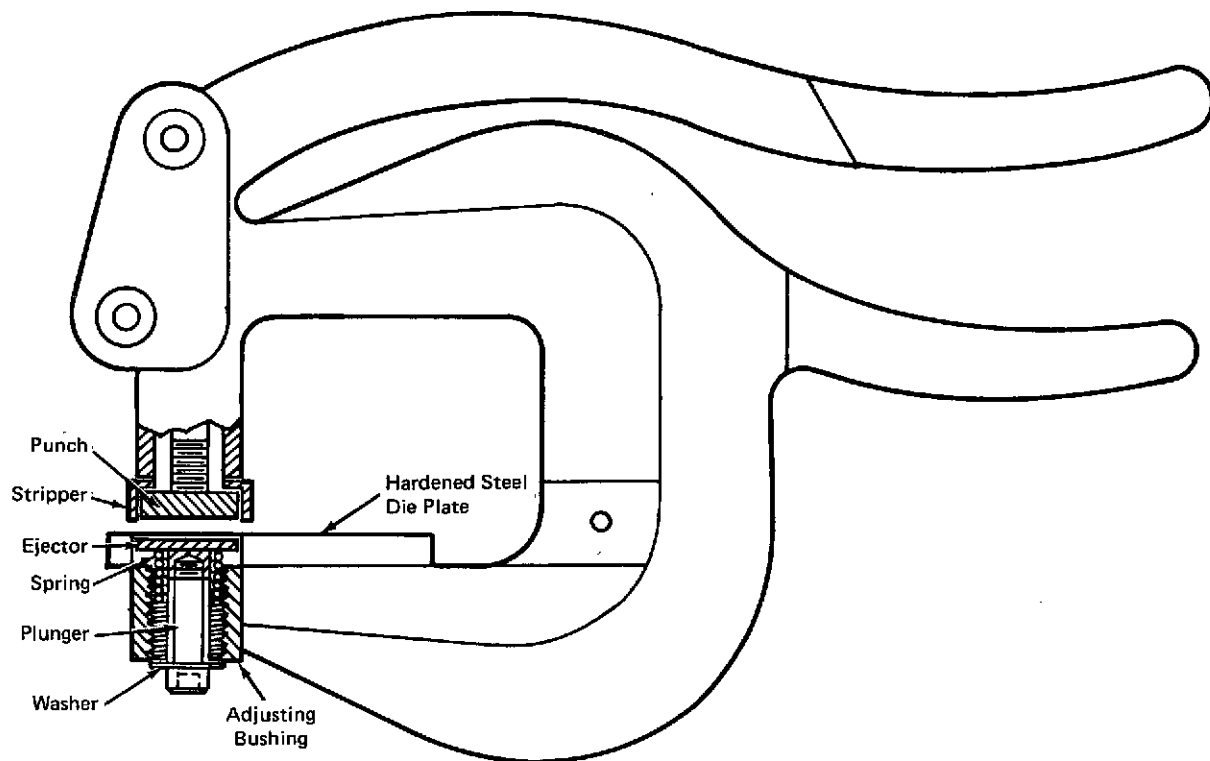
The four adapter models shown (in Figure 1) include the threaded shank type, for angle motors in close areas and the hand model, for use when power tools are not available or desired. The sanding discs are cut from emery paper with double-faced tape applied to the back side. The first-step arc punch and the pilot-hole punch, with centering template washer (Figure 2), are available in many sizes.

Source: R. L. Peters of
Rockwell International Corp.
under contract to
Johnson Space Center
(MSC-15597)

Circle 7 on Reader Service Card.

Section 3. Tools for Inspection, Analysis, and Testing

TEST PUNCH



The taking of a sample of a known area from a moving strip of battery plaque can be accomplished by using the tool shown in the figure. This tool was modified from a commercial punch. A hardened steel plate was fixed in place and used as a die. A new shaft was manufactured, and a new 1-in. (2.54-cm) diameter punch was affixed by capscrews. A brass stripper plate was attached so that it would not interfere with operation. A spring-loaded plunger was installed in the die so that the sample would remain in the tool, until the operator had taken the sample and removed both tool and sample from the moving material.

Previously, the only samples that could be taken were cut in a V from the outside edge, and the amount of material acquired was not of the same area. This present method enables the operator to punch a known area from any portion of the plaque. The quality and tolerances of plaque may be determined immediately, instead of waiting until the run has been completed.

Source: B. Kelbaugh and E. Smigocki
Goddard Space Flight Center
(GSC-10939)

Circle 8 on Reader Service Card.

MULTIPLE-SCISSOR VIAL LOADER AND UNLOADER

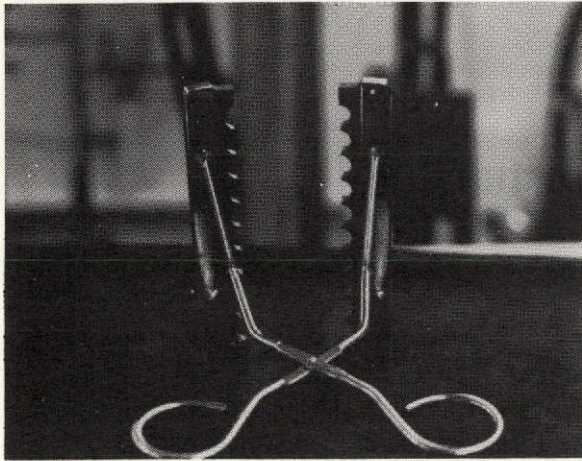


Figure 1

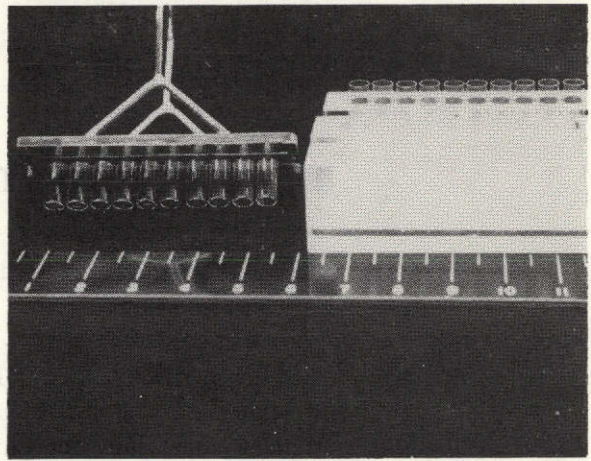


Figure 2

In some laboratory work, vials containing liquids currently have to be loaded and unloaded in or from a rack in a specifically designated sequence. The vials are loaded and unloaded one at a time. This is a time-consuming procedure which presents chances of error.

A multiple-scissor, vial-handling device (see figure) makes it possible to load or unload up to ten vials simultaneously, thus saving time and reducing the chance of an error. The tool is a stainless scissor clamp with a strip of silicone rubber cushioning and a series of ten half circles bonded to both sides of

the clamps. The vials are placed in the numbered (1 through 10) plastic vial holders. Then the vials are picked up by the multiple-scissor instrument and either loaded or unloaded in groups of ten, in proper sequence.

Source: M. E. Colburn and B. Kelbaugh
Goddard Space Flight Center
(GSC-11249)

No further documentation is available.

Patent Information

The following innovation, described in this Compilation, is being considered for patent action as indicated below:

Honeycomb Insert Facing Tool (Page 3) MFS-21485

This invention is owned by NASA, and a patent application has been filed. Inquiries concerning nonexclusive or exclusive license for its development should be addressed to:

Patent Counsel
Marshall Space Flight Center
Code A&PS-PAT
Marshall Space Flight Center, Alabama 35812
